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Addressing Racial Disparities in Health Care One Inequality at a Time: Total Knee Replacement

Frank Griffin, M.D., J.D.*

INTRODUCTION

“Distinctions of race, nationality, colour, and creed are unknown within the portals of the temple of Aesculapius.”
Sir William Osler¹

Independent of income or insurance status, racial disparities in utilization of beneficial medical procedures are well documented, and the largest disparity in the United States is between African Americans and Caucasians.² Since the enactment of Title VI of the Civil Rights Act of 1964 (Title VI), racial bias has been prohibited for health care providers receiving Medicare and Medicaid funding,³ but racial disparities persist. According to the Institute of Medicine (IOM), “there is no evidence that any significant proportion of health care professionals in the United States harbors overtly prejudicial attitudes,”⁴ so the cause appears to be complex

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¹ THE QUOTABLE OSLER, Revised Paperback Edition, 71 (American College of Physicians 2008) (explaining that Aesculapius is the “Greek god of healing and patron deity of physicians”).

² Ruqaiyah Yearby, *Breaking the Cycle of “Unequal Treatment” with Health Care Reform: Acknowledging and Addressing the Continuation of Racial Bias*, 44 CONN. L. REV. 1281, 1287 (2012); Alan R. Nelson, *Unequal Treatment: Report of the Institute of Medicine on Racial and Ethnic Disparities in Health Care*, 76 ANN. THORAC. SURG. S1377, S1377 (2003) (noting disparities in cardiac surgeries, kidney procedures, total joint replacement surgeries, and many other medically beneficial procedures); see also Rene Bowser, *The Affordable Care Act and Beyond: Opportunities for Advancing Health Equity and Social Justice*, 10 HASTINGS RACE & POVERTY L.J. 69, 75–77 (2013) (noting that racial minorities “receive a lower quality and intensity of health care than white patients, even when they are insured at the same levels, have similar incomes, and present with the same types of health problems.”); see also Centers for Disease Control and Prevention (CDC), *African American Health: Creating Equal Opportunities for Health*, VITAL SIGNS (May 2, 2017), <https://www.cdc.gov/vitalsigns/aahealth/index.html>.

³ Yearby, *supra* note 2, at 1288.

⁴ Nelson, *supra* note 2, at S1377.

and multifactorial, potentially “rooted in historic inequalities, perpetuated through stereotyping and biases in the health care system, and aggravated by barriers of language, geography, and cultural familiarity.”⁵

In addition to the ethical implications of persistent health disparities based on race, it has been estimated that the combined “cost of health disparities and subsequent deaths due to inadequate and/or inequitable care is \$1.24 trillion,”⁶ and as minority groups become the majority over the next twenty-five years, correcting these disparities will become a growing economic priority.⁷

One way to help clarify the cause and propose solutions to racial disparities in health care is a focused approach on a single disparity with hopes that the principles may be applicable on a broader scale. Inequality in total knee arthroplasty (also known as “total knee replacement” or TKA) is a single disparity that lends itself to this type of targeted approach. Because TKA can potentially improve the quality of life and health for many Americans, the Agency for Healthcare Research and Quality (AHRQ) “consider[s] disparities in the utilization of total knee arthroplasty [to be a] key topic[.]”⁸ As an orthopedic surgeon with twenty years’ experience performing total knee replacements, I was surprised by recent orthopedic studies documenting worsening disparities between African Americans and Caucasians in use and complication rates of TKA.⁹ The number of TKAs performed is rapidly rising.¹⁰ Around 750,000 TKAs are

⁵ Bowser, *supra* note 2, at 76.

⁶ U.S. DEPT OF HEALTH & HUMAN SERVS., Office of Minority Health, *National Standards for Culturally and Linguistically Appropriate Services (CLAS) in Health and Health Care*, www.ThinkCulturalHealth.hhs.gov.

⁷ Charles S. Day, Daniel E. Lage & Christine S. Ahn, *Diversity Based on Race, Ethnicity, and Sex Between Academic Orthopaedic Surgery and Other Specialties: A Comparative Study*, 92 J. BONE & JOINT SURG. AM. 2328, 2328 (2010).

⁸ Wei Zhang, Stephen Lyman, Carla Boutin-Foster, Michael L. Parks, Ting-Jung Pan, Alexis Lan & Yan Ma, *Racial and Ethnic Disparities in Utilization Rate, Hospital Volume, and Perioperative Outcomes after Total Knee Arthroplasty*, 98 J. BONE & JOINT SURG. AM. 1243, 1244 (2016).

⁹ See, e.g., Nizar N. Mohamed, Jane Barrett, Jeffrey N. Katz, John A. Baron, John Wright & Elena Losina, *Epidemiology of Total Knee Replacement in the United States Medicare Population*, 87A(6) J. BONE & JOINT SURG. AM. 1222, 1222 (2005) (“[B]lack had higher rates of mortality, readmission, and wound infection” than whites); Zhang et al., *supra* note 8, at 1243 (“One specific area of medical care in which racial disparities have been identified is total joint replacement, particularly total knee arthroplasty.”).

¹⁰ Elena Losina, Thomas S. Thornhill, Benjamin N. Rome, John Wright &

performed in the U.S. annually¹¹ with the number projected to grow to almost 3.5 million by 2030,¹² so continuing disparities will lead to even greater negative impacts over the next fifteen years.

This paper analyzes the reasons behind and proposes solutions to the widening disparity between black and white Americans in the utilization and complication rates for TKA.

I. THE FACTS: RACIAL DISPARITIES IN TKA UTILIZATION AND COMPLICATIONS

Osteoarthritis of the knee affects approximately 6% of the adult population. The disease is equally prevalent among blacks and whites and is a leading cause of disability in the United States.¹³ Knee osteoarthritis is typically treated initially nonoperatively with a regime of anti-inflammatory medications, weight loss (in obese patients), physical therapy, and/or injections. Once the patient has exhausted nonoperative treatments but still has pain, TKA may be considered by an orthopedic surgeon. TKA is chiefly a pain-relieving operation, but may also improve knee function in some cases. TKA is an elective, non-emergent procedure, and “[i]ndividual priorities and perceptions drive health care choice in any elective activity or procedure.”¹⁴ Since pain level is a subjective complaint that is difficult to determine objectively, timing of TKA often depends upon the patient’s and surgeon’s subjective perceptions of the patient’s pain

Jeffrey N. Katz, *The Dramatic Increase in Total Knee Replacement Utilization Rates in the United States Cannot Be Fully Explained by Growth in Population Size and the Obesity Epidemic*, 94 J. BONE & JOINT SURG. AM. 201–07 (2012).

¹¹ Healthcare Cost and Utilization Project (HCUP), *Fast Stats: Most Common Operations During Inpatient Stays*, <https://www.hcup-us.ahrq.gov/faststats/NationalProceduresServlet>.

¹² Steven Kurtz, Kevin Ong, Edmund Lau, Fionna Mowat & Michael Halpern, *Projections of Primary and Revision Hip and Knee Arthroplasty in the United States from 2005 to 2030*, 89 J. BONE & JOINT SURG. AM. 780 (2007).

¹³ Atul F. Kamath, John G. Horneff, Vandy Gaffney, Craig L. Israelite & Charles L. Nelson, *Ethnic and Gender Differences in the Functional Disparities After Primary Total Knee Arthroplasty*, 468 CLIN. ORTHOP. RELAT. RES. 3355, 3355 (2010); Zhang et al., *supra* note 8, at 1244 (confirming “similar risks of developing arthritis” between blacks and whites).

¹⁴ Huan J. Chang, Priya S. Metha, Aaron Rosenberg & Susan C. Scrimshaw, *Concerns of Patients Actively Contemplating Total Knee Replacement: Differences by Race and Gender*, 51(1) ARTHRITIS & RHEUMATISM 117, 120 (2004).

level. Surgeons often consider TKA to be necessary when patients begin having problems sleeping at night or performing their necessary activities of daily living due to pain. Some surgeons and patients push the envelope and perform TKA at earlier stages, while others wait much longer before proceeding with the surgery.

The TKA procedure involves the surgeon removing the worn-out cartilage from the ends of the knee bones (including the femur, tibia, and patella) and replacing the worn-out areas with metal and plastic (i.e., polyethylene) parts. The procedure is performed through an incision over the front of the knee under a general or spinal anesthetic, and the patient typically spends one to three days in the hospital afterward. TKA is widely accepted as an effective procedure that leads to “substantial improvement in quality of life in most patients.”¹⁵ TKA has been shown to effectively reduce pain, restore function, improve quality of life, and be cost-effective as a treatment for end-stage osteoarthritis of the knee, especially when medical management fails.¹⁶ In fact, since the 1980s, TKAs have produced over 90% good or excellent outcomes even in patients under age fifty-five at the time of their surgery who were studied up to eighteen years later, and use of TKA has grown exponentially over the past thirty years.¹⁷ TKA generally carries a small risk of death and long-term complications including infection, neurologic injury, and need for reoperation.¹⁸

¹⁵ Anne R. Bass, Kelly McHugh, Kara Fields, Rie Goto, Michael L. Parks & Susan M. Goodman, *Higher Total Knee Arthroplasty Revision Rates Among United States Blacks than Whites: A Systematic Literature Review and Meta-Analysis*, 98 J. BONE & JOINT SURG. AM. 2013, 2103 (2016).

¹⁶ Kamath et al., *supra* note 13, at 3355.

¹⁷ See, e.g., JOHN N. INSALL & W. NORMAN SCOTT, SURGERY OF THE KNEE 1658 (3d ed. 2001); Wayne A. Colizza, John N. Insall & Giles R. Scuderi, *The Posterior Stabilized Total Knee Prosthesis: Assessment of Polyethylene Damage and Osteolysis After a Ten-Year-Minimum Follow-Up*, 77 J. BONE & JOINT SURG. AM. 1713, 1713 (1995) (reporting 96% good or excellent results at ten years eight months follow-up); Steven H. Stern & John N. Insall, *Posterior Stabilized Prosthesis: Results After Follow-Up of Nine to Twelve Years*, 74 J. BONE JOINT SURG. AM. 980, 980 (1992); David R. Diduch, John N. Insall, W. Norman Scott, Giles R. Scuderi & David Font-Rodriguez, *Total Knee Replacement in Young, Active Patients: Long-Term Follow-Up and Functional Outcome*, 79 J. BONE & JOINT SURG. AM. 575 (1997).

¹⁸ Jonathan Skinner, James N. Weinstein, Scott M. Sporer & John E. Wennberg, *Racial, Ethnic, and Geographic Disparities in Rates of Knee Arthroplasty Among Medicare Patients*, 349 N. ENG. J. MED. 1350, 1358 (2003) [hereinafter *Disparities Among Medicare Patients*].

TKA use has increased exponentially over the past few decades, but there remains a persistent and widening disparity in utilization rates between blacks and whites.¹⁹ For example, in 2003, blacks had rates of TKA that were 37% lower than those in whites.²⁰ Three years later, in 2006, the disparity increased, with blacks undergoing TKA at a rate 39% lower than whites.²¹ By 2010, the disparity had grown such that blacks were undergoing TKA 50% less than whites.²² Similarly, in another study from 2002 through 2008, TKA use increased in all groups, was higher in whites than blacks in all years, and the disparity grew from the beginning to the end of the study with “a comparison of the data for 2002 and 2008 demonstrat[ing] that the difference in utilization of total knee arthroplasty increased for whites by 32% compared with blacks.”²³

African American patients also have higher complication rates after TKA than Caucasian patients. First, black patients visit the emergency department (ED) more frequently postop after TKA than whites, most commonly to complain of unrelieved pain.²⁴ Second, blacks have a higher risk of death (that is, higher mortality rates)

¹⁹ Bass et al., *supra* note 15, at 2103; Alvin Jones, C. Kent Kwok, Mary E. Kelley & Said A. Ibrahim, *Racial Disparity in Knee Arthroplasty Utilization in the Veterans Health Administration*, 53(6) ARTHRITIS & RHEUMATISM 979, 979 (2005); Alvin Jones Jonathan Skinner, Weiping Zhou & James Weinstein, *The Influence of Income and Race on Total Knee Arthroplasty in the United States*, 881(10) J. BONE & JOINT SURG. AM. 2159, 2159–66 (2006) [hereinafter *Influence of Income*]; Jasvinder A. Singh, Xin Lu, Gary E. Rosenthal, Said Ibrahim & Peter Cram, *Racial Disparities in Knee and Hip Total Joint Arthroplasty: An 18-Year Analysis of National Medicare Data*, 73(12) ANN. RHEUM. DIS., 2107, 2107–15 (2014) (showing no evidence of decline); Zhang et al., *supra* note 8, at 1250 (“[T]he odds of receiving joint replacement therapy recommendations [are] lower for black patients than for white patients.”).

²⁰ Andrew J. Rosenbaum, Richard L. Uhl, E. Anthony Rankin & Michael T. Mulligan, *Social and Cultural Barriers: Understanding Musculoskeletal Health Literacy*, 98 J. BONE & JOINT SURG. AM. 607, 607–15 (2016) (quoting *Disparities Among Medicare Patients*, *supra* note 18).

²¹ Kamath et al., *supra* note 13, at 3356.

²² Chang et al., *supra* note 14, at 117 (noting that in 2010, whites received TKA at a rate more than twice the rate of TKA in blacks); *see also* Zhang et al., *supra* note 8, at 1244 (likewise confirming that “white men are twice as likely as black men to undergo total knee arthroplasty despite similar risks of developing arthritis.”).

²³ Zhang et al., *supra* note 8, at 1250.

²⁴ Micaela A. Finnegan, Robyn Shaffer, Austin Remington, Jereen Kwong, Catherine Curtin & Tina Hernandez- Boussard, *Emergency Department Visits Following Elective Total Hip and Knee Replacement Surgery: Identifying Gaps in Continuity of Care*, 99 J. BONE & JOINT SURG. AM. 1005, 1009 (2017).

after TKA, in addition to other complications like infection and stiffness requiring manipulation under anesthesia.²⁵ Third, blacks have worse functional knee scores two years after TKA compared to whites.²⁶ Fourth, blacks have an increased rate of readmission within thirty days of TKA compared to whites.²⁷ Finally, blacks are at significantly higher risk of TKA revision than whites—including higher risks for TKA failure due to loosening, instability, fracture, stiffness, and infection.²⁸

II. ETIOLOGY OF RACIAL DISPARITIES IN TKA

The etiology of racial disparities in TKA is multifactorial and complex.²⁹ The disparities persist regardless of socioeconomic status and patient demographics.³⁰ For example, disparities in TKA use and

²⁵ Mahomed et al., *supra* note 9, at 1222 (“Blacks [in Medicare population] had higher rates of mortality, readmission, and wound infection after primary knee replacement than whites did” and also higher rates of manipulation); Benedict U. Nwachukwu, Adrian D. Kenny, Elena Losina, Lori B. Chibnik & Jeffrey N. Katz, *Complications for Racial and Ethnic Minority Groups After Total Hip and Knee Replacement: A Review of the Literature*, 92 J. BONE & JOINT SURG. AM. 338, 338 (2010) (“On the basis of the available literature, racial and ethnic minority groups appear to have a higher risk for early complications (those occurring within ninety days), particularly joint infection, after total knee replacement and perhaps a higher risk of mortality after total hip replacement.”); Zhang et al., *supra* note 8, at 1246, 1247, 1249 (“Overall, minorities were found to be associated with . . . higher rates of in-hospital mortality and complications . . . Racial disparities were also found for mortality and complications across years” with “blacks . . . ha[ving] higher rates of in-hospital mortality than whites,” “[i]ncreased odds of in-hospital complications,” and “the risk of perioperative mortality was significantly higher for blacks.”).

²⁶ Kamath et al., *supra* note 13, at 3358, 3359.

²⁷ Brianna L. Siracuse, Joseph A. Ippolito, Peter D. Gibson, Pamela A. Ohman-Strickland & Kathleen S. Beebe, *A Preoperative Scale for Determining Surgical Readmission Risk After Total Knee Arthroplasty*, 99 J. BONE JOINT SURG. AM. e112, e112(5) tbl.III, e112(7) (2017) (noting a RATKA score of seven for African American race with each point equaling a 0.25% increased chance of readmission within thirty days of discharge, thus totaling a 1.75% increased risk).

²⁸ Bass et al., *supra* note 15, at 2106.

²⁹ See Zhang et al., *supra* note 8, at 1249–50.

³⁰ Nwachukwu et al., *supra* note 25, at 339 (noting that disparities in TKA utilization persist even in populations with the same insurance status saying, “Even after controlling for health insurance status, whites are more than twice as likely as blacks to undergo total joint replacement.”); *Influence of Income*, *supra* note 19, at 2164 (noting “total knee replacement rates among minority groups are substantially lower than the rate for whites,” even after controlling for financial income revealing that the differences are not the result of socioeconomic class because they persist when comparing black, Asian, or white Medicare enrollees with similar socioeconomic statuses);

complication rates were noted by researchers independently studying the general U.S. population, the Medicare population (that is, generally patients over age sixty-five), and military veterans. First, in a broad study reflecting the entire U.S. population using “nationally representative data . . . across multiple years and states,” significant racial disparities in TKA use exist “even after adjusting for certain patient demographics, socioeconomic status, and health care system characteristics.”³¹ Second, among the older Americans who make up the Medicare population, compared with whites, black Medicare recipients are less likely to undergo total knee replacement³² and have higher complication rates after TKA than white Medicare recipients.³³ Third, in a study of 260,856 Veterans Administration patients older than fifty, black patients were significantly less likely to undergo TKA than white patients with the same diagnosis of knee osteoarthritis.³⁴ Likewise, studies of veterans have shown that black veterans have higher TKA complication rates than white veterans.³⁵ Likewise, another researcher noted, “[e]ven after controlling for health insurance status, whites are *more than twice as likely* as blacks to undergo total joint replacement.”³⁶ Therefore, disparities in TKA do not appear to be dependent upon insurance demographics.

However, the disparity, while present regardless of socioeconomic status, is likely influenced somewhat by socioeconomic status because socioeconomic status is “an important confounder of race,” and it is possible that black Medicare patients and military veterans were more affected by poverty in the above studies, even though their insurance statuses were the same as for white patients in those studies.³⁷ Medicaid is a surrogate marker for

Chang et al., *supra* note 14, at 117 (“The lower rates persist even when adjusted for age, sex, and insurance coverage.”).

³¹ Zhang et al., *supra* note 8, at 1251.

³² Mahomed et al., *supra* note 9, at 1225.

³³ *See id.*

³⁴ Jones et al., *supra* note 19, at 980.

³⁵ Zhang et al., *supra* note 8, at 1244.

³⁶ Nwachukwu et al., *supra* note 25, at 339 (emphasis added).

³⁷ Bass et al., *supra* note 15, at 2106; Daryll C. Dykes, *Health Injustice and Justice in Health: The Role of Law and Public Policy in Generating, Perpetuating, and Responding to Racial and Ethnic Health Disparities Before and After the Affordable Care Act*, 41 WM. MITCHELL L. REV. 1129, 1206 (2015) (noting that poverty, education, and social structure “not only

socioeconomic status.³⁸ TKA is less common among Medicaid patients of all races and among patients living in poverty.³⁹ Black patients are more likely than whites to be on Medicaid, with 32% of blacks in one study being on Medicaid, compared to only 15% of whites.⁴⁰ Likewise, blacks are more likely to be uninsured than whites with 21–26% of blacks being uninsured versus 13–16% of whites.⁴¹ Low income level, especially among black men, is associated with larger differences in arthroplasty rates.⁴² Also, both black men and women asked more questions about financial issues during preoperative questioning than whites, which suggests a greater level of concern regarding financial issues.⁴³ Low socioeconomic status is “an independent risk factor for adverse outcomes after orthopedic procedures.”⁴⁴ Poverty is associated with poor health, and blacks have incomes below the poverty level more prevalently than whites: 16% versus 12%.⁴⁵ For example, black patients with Medicaid are four times more likely to return to the ED within thirty days of surgery for postoperative pain than black patients with private insurance.⁴⁶ Medicaid patients often have unique structural barriers to accessing care (like transportation and limited access to private clinics) that likely increase ED usage in addition to financial resource limitations.⁴⁷ Thus, socioeconomic status likely adds a relatively small factor to TKA disparity but cannot explain it alone.

In addition, like socioeconomic status, biology does not appear to provide an explanation for the disparities. While some health care disparities can be explained by biology, the clear majority cannot. Some health disparities result from basic biological differences between populations—for example, cystic fibrosis is prevalent

influence the health of populations but also limit the ability of many to achieve health equity.”).

³⁸ Bass et al., *supra* note 15, at 2106.

³⁹ Mahomed et al., *supra* note 9, at 1225 (noting compared with patients not receiving Medicaid, people receiving Medicaid are less likely to undergo primary TKA (rate ratio 0.74)).

⁴⁰ Bass et al., *supra* note 15, at 2107.

⁴¹ *Id.*

⁴² See *Disparities Among Medicare Patients*, *supra* note 18, at 1352, 1357.

⁴³ See Chang et al., *supra* note 14, at 118, 121.

⁴⁴ Nwachukwu et al., *supra* note 25, at 344.

⁴⁵ Bass et al., *supra* note 15, at 2106–07.

⁴⁶ Finnegan et al., *supra* note 24, at 1011.

⁴⁷ *Id.*

among people of European descent, Tay-Sachs diseases is prevalent in Ashkenazi Jews, and sickle cell anemia is prevalent in populations with Sub-Saharan African ancestry.⁴⁸ But no such explanation is present to explain disparities between whites and blacks when it comes to TKA. First, biology does not explain the disparity in utilization rates. Inequalities in the prevalence of osteoarthritis of the knee between blacks and whites do not explain the disparities because, if anything, knee osteoarthritis is more common in blacks than whites.⁴⁹ Further, I cannot find any significant research evidence of anatomic or physiologic differences between black and white knees to account for utilization or complication differences. This suggests that blacks may be suffering unnecessarily from pain and disability due to lower intervention rates.⁵⁰

Second, higher complication rates among blacks do not appear to be related to biologic factors like higher comorbid risk factors, even though blacks and whites do have differences in comorbid factors pre-operatively in some studies. The TKA disparities have been found to be present even when controlling for comorbidities.⁵¹ For example, in veterans, white patients had higher rates of heart attack, congestive heart failure, vascular disease, chronic lung disease, and rheumatologic disease, while black patients had higher rates of complicated diabetes,

⁴⁸ Dykes, *supra* note 37, at 1134.

⁴⁹ Jones et al., *supra* note 19, at 979 (noting knee osteoarthritis is “equally prevalent among African Americans and whites”); Dorothy D. Dunlop, Jing Song, Larry M. Manheim & Rowland W. Chang, *Racial Disparities in Joint Replacement Use Among Older Adults*, 41 MED. CARE 288–98 (2003); Joanne M. Jordan, G. Fletcher Linder, Jordan B. Renner & John G. Fryer, *The Impact of Arthritis in Rural Populations*, 8 ARTHRITIS CARE RES. 242–50 (1995); Mahomed et al., *supra* note 9, at 122 (noting “difference in utilization rates is unlikely to be due to differences in the prevalence of osteoarthritis between whites and blacks.”); *Disparities Among Medicare Patients*, *supra* note 18, at 1351 (“[R]ates of osteoarthritis are generally higher among blacks . . . than among whites.”); *Influence of Income*, *supra* note 19, at 2164; Nwachukwu et al., *supra* note 25, at 338 (“In fact, the burden of osteoarthritis is at least as prevalent—and possibly more prevalent—in blacks than in whites.”); Rosenbaum et al., *supra* note 20, at 609 (quoting *Disparities Among Medicare Patients*, *supra* note 18); Zhang et al., *supra* note 8, at 1244 (“[W]hite men are twice as likely as black men to undergo total knee arthroplasty despite similar risks of developing arthritis.”); Nwachukwu et al., *supra* note 25, at 338 (“In fact, the burden of osteoarthritis is at least as prevalent—and possibly more prevalent—in blacks than in whites.”).

⁵⁰ Chang et al., *supra* note 14, at 117.

⁵¹ Bass et al., *supra* note 15, at 2103, 2106.

dementia, cancer, renal disease, and AIDS,⁵² but these differences in comorbid factors do not appear to account for differences in complication rates since a total of 27.63% of white patients had comorbidity compared to only 23.36% of blacks.⁵³ Similarly, in another study of preoperative risk factors, white patients appeared to be afflicted more commonly with risk factors rated as more significant.⁵⁴ No study could be located to attribute a higher complication rate among blacks related to these differences in comorbidities; for example, in the study demonstrating a higher risk of return to the ED postoperatively in black patients, the researchers did not report comorbidities as the reason.⁵⁵

So, if it is not socioeconomic status, demographics, or biology, then what is causing the disparities in use and complication rates between African Americans and Caucasians when it comes to TKA? In my opinion, causes of the TKA disparity likely include (A) trust factors (including distrust, cultural differences, and bias/stereotyping), (B) differences in health literacy/informed consent between populations, and (C) changing laws that punish providers for taking on high risk or vulnerable patient populations.

A. TKA Trust Factors (Distrust, Cultural Differences, and Bias/Stereotyping)

Distrust of the health care system by African American patients is a double-edged sword leading to underutilization by patients and under-scheduling by doctors. Cultural differences between black patients and predominantly white orthopedic surgeons contribute to the disparity. Cognitive shortcutting by busy surgeons may play a role in decreased use of TKA in black patients.

⁵² Jones et al., *supra* note 19, at 980.

⁵³ *Id.* at 980, tbl.2.

⁵⁴ *Id.* at 980; Siracuse et al., *supra* note 27, at e112(5) tbl.III (noting that more common white patient comorbid factors had higher risk factors like CHF with a factor of 13 and COPD a factor of 6, compared to more common black comorbid factors like renal disease with a factor of 6 and diabetes a factor of 4).

⁵⁵ See Finnegan et al., *supra* note 24, at 1011–12.

- i. African American patients distrust physicians and the American health care system which likely leads to underutilization by patients and under-scheduling by surgeons.

There is strong evidence that African Americans have diminished trust in the medical system and health care providers,⁵⁶ and this distrust is likely one of the reasons blacks tend to prefer avoidance of surgical procedures like TKA.⁵⁷ Researchers from Johns Hopkins found that “blacks harbored a strong distrust for physicians when compared to whites.”⁵⁸ Specifically, four times as many blacks as whites did not feel comfortable questioning their physicians.⁵⁹ Similarly, over twice as many blacks as whites believed that “physicians use medications to experiment on people without their patients’ consent.”⁶⁰ In addition, many more blacks than whites thought their doctors would ask them to be in a harmful study.⁶¹

This distrust is understandable due to the age group of TKA patients and historical context of health care provided to African Americans in this age group.⁶² Total knee patients are typically between the ages of fifty and ninety, meaning that patients undergoing TKA today were usually born between 1928 and 1968, so they often have experienced outright and open discrimination in the health care system. Over 6,500 U.S hospitals were desegregated

⁵⁶ Chang et al., *supra* note 14, at 121 (noting abundant medical literature describes an understandable mistrust of the medical community and health care professionals among blacks since Tuskegee); *Disparities Among Medicare Patients*, *supra* note 18, at 1358 (citing blacks’ “general distrust of the health care system”).

⁵⁷ *Disparities Among Medicare Patients*, *supra* note 18, at 1358; Nwachukwu et al., *supra* note 25, at 343 (“Compared with whites, racial and ethnic minorities have been shown to be less likely to opt for total joint replacement and to have more advanced osteoarthritis at the time of surgery.”).

⁵⁸ Press Release, Johns Hopkins Medicine, Trust Between Doctors and Patients is Culprit in Efforts to Cross Racial Divide in Medical Research (January 14, 2008).

⁵⁹ *Id.* (8% versus 2%).

⁶⁰ *Id.* (58% versus 25%).

⁶¹ *Id.* (25% versus 15%).

⁶² This distrust is not unique to health care professionals since African Americans have similar distrust for legal professionals and the justice system (see, e.g., Sara Greene, *Race, Class, and Access to Civil Justice*, 101 IOWA L. REV. 1263 (2016) (noting that research shows that minority groups are less likely to seek help with a civil legal problem and that negative past experiences contribute to their decisions to avoid the legal system altogether)).

over a four-month period in 1966 by the Johnson Administration using Title VI along with “the sudden infusion of . . . federal Medicare dollars.”⁶³ During that time, the “white only” signs were removed and rooms were assigned in a race-blind manner for the first time on a large scale.⁶⁴ However, physicians were generally allowed to continue to refuse to treat black patients.⁶⁵ The patterns of care that evolved have continued to effect segregation of medical practices. Even today, African American patients are “almost twice as likely as whites to get outpatient physician care from safety net providers like hospital-based clinics and emergency rooms” regardless of insurance coverage.⁶⁶ Hospital-based practices tend to produce less continuity of care for patients and are characterized by rotating physicians, which means “minority patients are less likely to have an ongoing relationship with a primary care provider who can serve as an advocate to ensure patients receive specialty care” like TKA.⁶⁷ “Physicians and hospitals both tend to avoid minority neighborhoods because residents tend to be poorer and more likely to be either uninsured or covered by Medicaid,” and “[p]hysicians tend to avoid Medicaid patients primarily, but not exclusively, because reimbursement rates are often lower than for privately insured and Medicare patients.”⁶⁸ Also, health plans “designate their service areas to avoid inner city areas with high concentrations of minority patients” and “avoid advertising in minority areas to avoid attracting minorities.”⁶⁹

So, black TKA patients today are often of an age such that they would have lived through a time when it could be dangerous for them to speak up because TKA patients are usually in their 50’s to 80’s—meaning that many of today’s TKA patients would have lived through the times when hospitals were openly segregated through the 1960s.⁷⁰ Negative, early experiences with a discriminatory health

⁶³ Sidney D. Watson, *Section 1557 of the Affordable Care Act: Civil Rights, Health Reform, Race, and Equity*, 55 HOW. L.J. 855, 864–70 (2012).

⁶⁴ *Id.*

⁶⁵ *See id.*

⁶⁶ *Id.*

⁶⁷ *Id.*

⁶⁸ Watson, *supra* note 63, at 868.

⁶⁹ *Id.*

⁷⁰ Chang et al., *supra* note 14, at 121.

care system combined with ongoing disparities likely contribute to avoidance of the system altogether when possible by many blacks of TKA age. Some have speculated that minorities may rationalize inaction as a means to “portray[] themselves as self-sufficient citizens who solve their own problems.”⁷¹ For example, in one study, researchers noted that blacks have a greater belief in the efficacy of physical therapy, Tylenol, herbal medicine, massage, and prayer to treat osteoarthritis than whites.⁷² Similarly, researchers in another study found that “compared with whites, blacks were more likely to rely on self-care measures such as prayer and were less likely to consider surgery for severe arthritis pain.”⁷³ Decisions to stay away from the health care system likely contribute to increased complications—especially diminished functional outcomes—related to having surgery at a more advanced stage of osteoarthritis disease of the knee which may include less range of motion, contractures, etc.⁷⁴

Distrust is evident in black patients’ interactions with orthopedic surgeons during discussions regarding knee osteoarthritis.⁷⁵ Black patients have different concerns and ask orthopedists different types of questions than white patients.⁷⁶ Blacks raise more issues pertaining to physician trust with black men raising them more directly than black women.⁷⁷ Black women especially express concern over their own candidacy for TKA and the criteria used to determine whether TKA is necessary, which may be reflective of higher levels of physician distrust.⁷⁸ Concerns about being perceived as naive, powerless, or afraid to speak also tend to suggest diminished trust in the doctor-patient relationships, and black men tend to ask the fewest questions, which may be a manifestation of this concern.⁷⁹

Unfortunately, distrust is likely a double-edged sword for elective procedures like TKA. Not only are blacks

⁷¹ Greene, *supra* note 62, at 1263.

⁷² *Influence of Income*, *supra* note 19, at 2164.

⁷³ Zhang et al., *supra* note 8, at 1250.

⁷⁴ Kamath et al., *supra* note 13, at 3359 (“Longer delay to presentation for African Americans may partly explain worse [function scores] postoperatively”).

⁷⁵ Chang et al., *supra* note 14, at 121.

⁷⁶ *See id.*

⁷⁷ *Id.*

⁷⁸ *Id.*

⁷⁹ *Id.*

underutilizing and delaying the service due to distrust, but also surgeons are likely delaying or under-scheduling black patients for elective TKA procedures due to their expressions of distrust. The IOM concluded that “health-care providers are less likely to provide alternative treatments and services for patients . . . conveying mistrust.”⁸⁰ As a surgeon, I was taught that operating on a patient is like marrying them to your practice—once you cut on them, they are yours as a surgeon to deal with forever—for better or worse. Regardless of race, I tended to avoid performing elective operations like TKA on patients who did not seem to trust me. I believed that distrustful patients were more likely to sue me, which could have severely damaged my practice and my personal life.⁸¹ Likewise, I believed that patients who did not trust me were more likely to be postoperative headaches requiring more of my time to deal with by second-guessing me or ignoring my recommendations—which can increase their risk of complications. If other surgeons think similarly, and I believe that most do, orthopedic surgeons may be subconsciously screening out more black patients from elective TKA surgery due to the perceived risk to their practices posed by patients who express distrust.

- ii. Cultural differences affect black patients’ surgical preferences and predominantly white orthopedic surgeons’ treatment decisions.

Culture is defined as “the integrated pattern of thoughts, communications, actions, customs, beliefs, values, and institutions associated, wholly or partially, with racial, ethnic, or linguistic groups as well as religious, spiritual, biological, geographical, or sociological characteristics.”⁸² Researchers note that “culturally based factors (such as feelings about the helpfulness of prayer and other forms of complementary treatments) can influence ethnic variations in how individuals perceive and

⁸⁰ Zhang et al., *supra* note 8, at 1250.

⁸¹ Sandra Levy, *Physicians React: Life After a Lawsuit*, MEDSCAPE (June 14, 2017), <https://www.medscape.com/viewarticle/880269>.

⁸² U.S. DEP’T OF HEALTH & HUMAN SERVS. (HHS), *A Physician’s Practical Guide to Culturally Competent Care*, https://cccm.thinkculturalhealth.hhs.gov/Content/Course1/Module1/Module1_1_5.asp.

manage diseases such as arthritis, which can subsequently impact the utilization of health care services.”⁸³ For TKA, as mentioned above, black patients generally tend to have more faith in the efficacy of nonoperative measures for knee arthritis like prayer, massages, herbal medicine, over-the-counter medications, and physical therapy than white patients, which may be reflective of differing cultural views.⁸⁴ Likewise, some researchers suggest that blacks simply prefer to delay the surgery longer than whites with cultural differences playing a role.⁸⁵

In addition, cultural differences between blacks and whites contribute to geographic segregation of communities in a way that facilitates disparities in TKA. High degrees of geographic racial segregation are associated with lower arthroplasty rates, especially among black women.⁸⁶ In one study, 35% of the national differences in arthroplasty rates for black women could be explained by the fact that black women are more likely to live in regions with lower rates of arthroplasty for all racial groups.⁸⁷ Variations in procedure rates are strongly influenced by “local medical opinion”⁸⁸ with regional variations in the rates of elective surgery possibly reflecting differences in local medical opinion concerning the value of these procedures.⁸⁹ If primary care doctors in racially segregated communities do not believe TKAs are efficacious or prefer other treatment options, then they will not refer the patients to orthopedic surgeons and disparities will be expected to persist.

Further, cultural differences may contribute to language barriers that affect TKA access and success. Most orthopedic surgeons are white men.⁹⁰ Researchers conclude

⁸³ Zhang et al., *supra* note 8, at 1250.

⁸⁴ *Influence of Income*, *supra* note 19, at 2164.

⁸⁵ See Nwachukwu et al., *supra* note 25, at 339 (“Differences in the utilization of orthopaedic procedures among various racial groups are likely multifactorial and influenced by factors such as preferences for surgery and operative outcome expectations among racial and ethnic minorities.”).

⁸⁶ *Disparities Among Medicare Patients*, *supra* note 18, at 1356.

⁸⁷ *Id.* at 1356–57.

⁸⁸ Center for the Evaluative Clinical Sciences, *A Dartmouth Atlas Project Topic Brief: Preference Sensitive Care*, DARTMOUTH ATLAS PROJECT (Jan. 15, 2007),

http://www.dartmouthatlas.org/downloads/reports/preference_sensitive.pdf.

⁸⁹ *Disparities Among Medicare Patients*, *supra* note 18, at 1351 (“Regional variations in the rates of discretionary surgery are commonly considered to reflect differences in local medical opinion.”).

⁹⁰ See Day et al., *supra* note 7, at 2328.

that white male patients tend to “speak the same language” as their orthopedic physicians giving them “important communication and rapport . . . long understood by medical anthropologists [studying] doctor-patient relationships,” which may “contribute to the proportionate increased use of TKA by white males compared to blacks and women.⁹¹ White men demonstrated “the greatest amount of factual background information” and “tended to ignore many issues that preoccupied other focus group participants” (e.g., trust of physician).⁹²

Moreover, some evidence suggests that orthopedists are more likely to underestimate black patients’ pain intensity level compared to whites.⁹³ Studies have shown that “providers [are] often more likely to prescribe opioids to white patients than to black . . . patients.”⁹⁴ If surgeons underestimate preoperative pain, they are less likely to offer TKA as an option since the primary indication for TKA is pain uncontrolled by nonoperative measures. Likewise, if the surgeon misjudges postoperative pain level, higher complication rates may occur. For example, higher rates of ED visits postoperatively may be partially related to providers underestimating pain levels in blacks and under-prescribing pain medications. In addition, blacks may be referred to rehab units less frequently, possibly due to pain-related communication breakdowns, accounting for longer durations of hospital stays.⁹⁵

iii. Subconscious bias and/or stereotyping may play a role in surgeon decision-making through cognitive shortcuts.

Subconscious bias and stereotyping in provider attitudes may play a role in TKA disparities, according to some researchers.⁹⁶ According to the Institute of Medicine, there is “no evidence that any significant proportion of healthcare professionals in the United States harbors overtly prejudicial attitudes.”⁹⁷ But even without overtly

⁹¹ Chang et al., *supra* note 14, at 121.

⁹² *Id.* at 118.

⁹³ Finnegan et al., *supra* note 24, at 1011.

⁹⁴ *Id.*

⁹⁵ Nwachukwu et al., *supra* note 25, at 343 (“It is also possible that non-whites are less likely to be referred to rehabilitation facilities after an acute hospital stay and to stay longer in the acute hospital on that basis.”).

⁹⁶ Nelson, *supra* note 2, at S1379.

⁹⁷ *Id.* at S3177.

prejudicial attitudes, provider attitudes may still play a role by subconsciously assuming stereotypes without making individual treatment decisions or by magnifying the risks associated with black patients undergoing TKA.

Physicians, like everyone else, use “cognitive shortcuts” in stereotyping patients using social categories (like race or sex) in “acquiring, processing, and recalling information” about patients.⁹⁸ These cognitive shortcuts can serve important functions in organizing and simplifying complex situations, but can also cause bias in well-meaning, well-educated people who are not overtly biased and even have potential self-fulfilling effects.⁹⁹ Use of cognitive shortcuts may be especially prevalent in physicians in high demand, time-limited, and resource-limited environments—like orthopedic surgeons considering TKA during a brief patient appointment.¹⁰⁰

Race is one factor that is considered by doctors in differential diagnosis and treatment decisions because some diseases are more typical among one race or ethnic group than another; for example, cystic fibrosis is prevalent among people of European descent, Tay-Sachs disease is prevalent in Ashkenazi Jews, and sickle cell anemia is prevalent in populations with Sub-Saharan African ancestry.¹⁰¹ Black patients do have higher complication rates than white patients—including higher mortality risk, higher readmission risk, higher infection risk, and others, as mentioned above. Compared to emergent/urgent surgeries, regardless of race, elective surgeries—like TKAs—are generally not recommended as aggressively in populations with higher expectations of complications. Therefore, race is important in the surgeon’s thought process in analyzing the appropriateness of proceeding with elective TKA procedures and the risks of surgery to be discussed preoperatively to obtain informed consent.

Orthopedic surgeons generally try to keep their complication rates as low as possible, not just for the patient’s benefit, but also for the benefit of their own careers. Increased complication rates can affect provider risk for malpractice, provider quality measures that affect reimbursement, and community reputation. Orthopedic

⁹⁸ *Id.* at 1379.

⁹⁹ *Id.*

¹⁰⁰ *See id.*

¹⁰¹ Dykes, *supra* note 37, at 1133–34.

surgeons are also under increased pressure by hospitals to ensure low readmission rates because “[r]eadmission rates following . . . total knee arthroplasty (TKA) are increasingly used to measure hospital performance.”¹⁰² Because black patients have higher readmission rates, admitting black patients for TKA carries an increased risk for hospitals receiving lower quality performance marks if a disproportionate number of black patients undergo TKA at that hospital. In addition, “Blue Cross and Blue Shield plans and other payers use readmission rates as part of their criteria for selecting centers of excellence,” and “[r]eadmission rates following . . . TKA also have been added to the formula used by the Centers for Medicare & Medicaid Services (CMS) Hospital Readmissions Reduction Program (HRRP).”¹⁰³ Under HRRP, “CMS reduces payments to hospitals that are identified as having excess readmissions . . . [and] CMS compares each hospital’s readmission rate with the U.S. national rate on its Hospital Compare website.”¹⁰⁴ Thus, given the financial and “quality” pressures, it is easy to speculate that orthopedic surgeons may be subconsciously screening out patients with documented higher risks for readmission and other complications (like African Americans) from the TKA population. All of these factors must be considered during the limited doctor-patient interaction, and cognitive shortcuts are likely employed by most doctors.

Further, many surgeons have a significant bias against performing TKAs in patients who are obese; some studies support the idea that obese patients have higher complication rates while others find that obese patients do well after TKA.¹⁰⁵ Higher rates of obesity in black patients

¹⁰² Grant R. Martsolf, Marguerite L. Barrett, Audrey J. Weiss, Ryan Kandrack, Raynard Washington, Claudia A. Steiner, Ateev Mehrotra, Nelson F. SooHoo & Rosanna Coffey, *Impact of Race/Ethnicity and Socioeconomic Status on Risk-Adjusted Hospital Readmission Rates Following Hip and Knee Arthroplasty*, 98 J. BONE & JOINT SURG. AM. 1385, 1385 (2016).

¹⁰³ *Id.* at 1385–86.

¹⁰⁴ *Id.* at 1386.

¹⁰⁵ Jared R.H. Foran, Michael A. Mont, Gracia Etienne, Lynne C. Jones & David S. Hungerford, *The Outcome of Total Knee Arthroplasty in Obese Patients*, 86(A) J. BONE JOINT SURG. AM. 1609, 1609–15 (2004); Frankie M. Griffin, Giles R. Scuderi, John N. Insall & Wayne Colizza, *Total Knee Arthroplasty in Patients Who Were Obese with 10 Years Followup*, 356 CLINICAL ORTHOPAEDICS & RELATED RES. 28, 28 (1998).

may contribute to higher complication rates and lower functional outcomes if those studies are correct.¹⁰⁶

It is possible that white, male orthopedic surgeons use cognitive shortcuts in assessing the distrust issues discussed above along with higher complication rates leading to stereotyping blacks such that blacks' access to TKA is limited disproportionately to the actual risks posed; if so, this could lead to prejudicial favoring of whites over blacks in TKA scheduling, even though the surgeons are not overtly racist or prejudicial.

B. Health Literacy and Informed Consent Factors May Increase the TKA Disparity by Contributing to Underutilization of TKA by Black Patients and Overutilization by White Patients

Almost nine out of ten adults fail proficiency tests in health literacy and “may lack the skills needed to manage their health and prevent disease.”¹⁰⁷ Racial and ethnic minorities are among populations most likely to experience low health literacy.¹⁰⁸ Health literacy affects decision making in health care for all races. Health literacy is defined as “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.”¹⁰⁹ Health literacy depends on factors like communication, knowledge, culture, context, and situational demands.¹¹⁰ Health literacy affects patients' ability to: (1) navigate the healthcare system to find orthopedic surgeons offering quality TKA services, (2) share personal information, such as level of knee pain and effect of knee arthritis on activities of daily living, and (3) understand mathematical concepts such as probability of surgical success of TKA and risks associated with the surgery.¹¹¹ People with low health literacy: (1) “[O]ften lack

¹⁰⁶ Kamath et al., *supra* note 13, at 3359 (“Obesity creates soft tissue impingement of the knee, limiting flexion arc directly related to limb girth.”).

¹⁰⁷ U.S. DEP'T OF HEALTH & HUMAN SERVS. (HHS), QUICK GUIDE TO HEALTH LITERACY, <https://health.gov/communication/literacy/quickguide/factsbasic.htm> (last visited Sept. 7, 2018).

¹⁰⁸ *Id.*

¹⁰⁹ *Id.*

¹¹⁰ *Id.*

¹¹¹ *Id.*

knowledge or have misinformation about the body as well as the nature and causes of disease,”¹¹² and (2) are more likely to have “poor health outcomes such as higher rates of hospitalization.”¹¹³

Health literacy can affect patients’ access to TKA if they are excluded because they do not know about the procedure, have erroneous ideas about the procedure so that they do not consider it, if they do not request referral to an orthopedic surgeon, have low expectations of outcomes, or if they choose their hospitals and orthopedic surgeons poorly. In addition, preoperative disparities in diabetes, obesity, and poor dentition may lead to higher complication rates among blacks, so a lack of health literacy regarding proper care of these conditions may lead to higher complication rates.

Differences in preoperative health literacy may lead black patients to underutilize TKA and choose lower-quality providers of TKA services impacting candidacy for TKA use and complication rates. Blacks may have less understanding of how to obtain quality orthopedic surgical services. First, many black patients “may have little knowledge or experience of where to go for specialty care.”¹¹⁴ As noted above, 35% of national arthroplasty disparities among black women were explained in one study by the fact that black women lived more frequently in regions with lower arthroplasty rates for all racial groups.¹¹⁵ If black patients are not given an opportunity to access orthopedic care for knee osteoarthritis due to practice patterns of primary care physicians in racially segregated communities, then lower rates of TKA will persist. In addition, blacks are less likely to use high-quality hospitals than whites, even though they are more likely to live near high-volume hospitals.¹¹⁶ This pattern likely contributes to higher complication rates among blacks. Physician referral patterns likely play a role in these choices, because providers in black communities are less likely to refer to high-volume TKA centers.¹¹⁷

¹¹² *Id.*

¹¹³ *Id.*

¹¹⁴ See Zhang et al., *supra* note 8, at 1250.

¹¹⁵ *Disparities Among Medicare Patients*, *supra* note 18, at 1356–57.

¹¹⁶ Bass et al., *supra* note 15, at 2106; Zhang et al., *supra* note 8, at 1246

(“Overall, minorities . . . were less likely to go to high-volume hospitals . . . [i]n comparison with whites,” and “[f]urthermore, minorities were less likely than whites to undergo total knee arthroplasty in high-volume hospitals.”).

¹¹⁷ See Zhang et al., *supra* note 8, at 1250.

Second, poor health literacy leading to diminished preoperative patient expectations regarding TKA outcomes may lead to lower utilization and more complications in blacks. Patients' expectations for benefits from knee surgery have been linked to requests to have the procedure, and blacks have considerably less belief in the efficacy of TKA than whites, so they may be less likely to request TKA.¹¹⁸ In addition, patients' preoperative expectations have been shown to correlate with surgical outcomes.¹¹⁹ Gains in postoperative physical and mental health outcomes from TKA can be predicted based upon patients' generalized expectations and efficacy beliefs present preoperatively, which account for up to a 13% variance in outcomes.¹²⁰ Therefore, lower preoperative expectations may partially explain worse outcomes.

"Blacks are less willing to undergo joint replacement in part because of a perception of increased surgical risk."¹²¹ Blacks preferred a "longer wait time for surgery" because of pain perception and fear of postoperative complications.¹²² Some of the decreased preoperative expectations are based in reality since blacks do have higher complication rates. Thus, increased complication rates among blacks may cause black patients to delay TKA until their knee arthritis has progressed to a more advanced stage leading to poorer functional outcomes, creating a cyclical conundrum.

Further, the assumption that whites' TKA rates are "correct" may need further evaluation under preference-sensitive care models to determine the true "correct" TKA utilization rate, because some of the disparity may be due to overuse of TKA by white patients who might not choose to undergo TKA if their health literacy was improved with regard to the procedure, and they received more information preoperatively allowing them to make better informed surgical decisions following their own true preferences. There is evidence that patients may not be

¹¹⁸ *Influence of Income*, *supra* note 19, at 2164; Chang et al., *supra* note 14, at 120; Nwachukwu et al., *supra* note 25, at 339.

¹¹⁹ Zhang et al., *supra* note 8, at 1250.

¹²⁰ *Id.*

¹²¹ Bass et al., *supra* note 15, at 2103.

¹²² Kamath et al., *supra* note 13, at 3356 ("The perception of pain and fear of postoperative complications [i.e., preoperative expectations are low] were reflected in a longer wait time for surgery, rather than an actual racial disparity in pain or function") (alteration in original).

getting adequate information preoperatively to make their own decisions. In a 2012 study, when patients received enhanced preoperative counseling for TKA with “decision aids” to help them make their own choices, TKA surgery rates dropped by 38%.¹²³ This suggests that, given a better understanding of the risks and benefits of TKA, a lot fewer white patients would choose TKA. If the rate of TKA among whites dropped by 38%, the disparity between blacks and whites in TKA utilization would not be near as great.

TKA is a form of “preference-sensitive care.” Preference-sensitive care “comprises treatments that involve significant tradeoffs affecting the patient’s quality . . . of life,” and decisions about these interventions “ought to reflect patients’ personal values and preferences.”¹²⁴ However, these types of treatments are prone to overuse when surgeons are so inclined.¹²⁵ Elective surgeries, like TKA, are particularly susceptible to “idiosyncratic practice style” of surgeons.¹²⁶ For example, “[i]n 2002–03, the rate of knee surgery in Fort Myers [Florida] was three times higher than the rate in Manhattan,” and the “rate in Sarasota [Florida] was 2.6 times higher, and the rate in Fort Lauderdale was about 1.8 times higher.”¹²⁷ These higher rates correlate with the “surgical signatures” of the communities correlating with the “propensity of local surgeons to specialize in a particular subset of the surgical workload in their specialty.”¹²⁸ Therefore, it is not surprising to find elevated rates of TKA in retirement communities in Florida where total joint specialist surgeons are more likely to locate paying TKA candidates. So, what is the “correct rate” of TKA surgery? The correct rate should “be based on the choices made by informed patients, with information about, but not dominated by, their physician’s opinions.”¹²⁹

Further support for the fact that “preference-sensitive” care issues contribute to the disparity is the fact that the disparity is likely more related to the elective

¹²³ Emily Oshima Lee & Ezekiel J. Emanuel, *Shared Decision Making to Improve Care and Reduce Costs*, 368 N. ENG J. MED. 6, 7 (2013).

¹²⁴ Center for the Evaluative Clinical Sciences, *A Dartmouth Atlas Project Topic Brief: Preference-Sensitive Care* 1 (Jan. 15, 2007), http://www.dartmouthatlas.org/downloads/reports/preference_sensitive.pdf.

¹²⁵ *Id.* at 1.

¹²⁶ *Id.*

¹²⁷ *Id.* at 3.

¹²⁸ *Id.*

¹²⁹ *Id.* at 5.

decision-making process than any inherent bias. For example, there are no such disparities when it comes to orthopedic surgeons offering operative treatment of distal radius fractures or hip fractures because neither is “preference-sensitive.” For distal radius fractures:

Treatment rates were similar across race, with the rate of nonoperative treatment being 84% for white beneficiaries compared with 83% for non-white beneficiaries, the rate of percutaneous fixation being 11% for white beneficiaries compared with 10% for non-white beneficiaries, and the rate of open treatment being 6% for white beneficiaries compared with 7% for non-white beneficiaries.¹³⁰

The authors concluded that “race [did not] significantly influence[] the likelihood of any of the treatment options.”¹³¹ Likewise in the hip fracture patients, preference-sensitive issues were less important.¹³² Therefore, the informed consent process for elective procedures like TKA that are “preference-sensitive” likely plays a significant role in disparities between races.

C. Changing “Quality” Laws May Be Worsening Disparities

Some laws intended to improve the quality of health care may be contributing to the worsening racial disparities in TKA. As noted above, orthopedic surgeons are increasingly under pressure by hospitals, major health insurers (for example, Blue Cross Blue Shield), and Medicare to ensure low readmission rates because hospital

¹³⁰ Jason Fanuele, Kenneth J. Koval, Jon Lurie, Weiping Zhou, Anna Tosteson & David Ring, *Distal Radial Fracture Treatment: What You Get May Depend on Your Age and Address*, 91 J. BONE & JOINT SURG. AM. 1313–19 (2009).

¹³¹ *Id.* at 1318.

¹³² Center for the Evaluative Clinical Sciences, *A Dartmouth Atlas Project Topic Brief: Preference-Sensitive Care*, 2 (Jan. 15, 2007), http://www.dartmouthatlas.org/downloads/reports/preference_sensitive.pdf (noting that hip fractures are an example where patient and physician preferences are essentially the same so that care is not “preference-sensitive”).

and doctor performance is measured partially by readmission rates after TKA. Black patients have a known higher risk for readmission.¹³³ Excess readmissions can limit providers' ability to be designated as a "center of excellence" and can lead to lower reimbursement rates for all of their TKAs.¹³⁴ In addition, providers may be subject to public embarrassment that affects their market share where readmission rates are posted on the public Physician Compare and Hospital Compare websites and compared to national readmission rates.¹³⁵ These readmission rates are not adjusted for socioeconomic status or for racial factors.¹³⁶ Medicare has at least two programs that negatively impact surgeons and hospitals with higher readmission numbers. First, the Bundled Payments for Care Improvement Initiative tests models that penalize hospitals with postoperative ED visits after joint replacements because those postoperative ED visits are not reimbursed beyond the initial bundled TKA payment.¹³⁷ As noted above, blacks have a higher number of postoperative ED visits than whites, so surgeons and hospitals are disincentivized from targeting black patients for TKA. Second, the Hospital Readmissions Reduction Program (HRRP) reduces future reimbursement to hospitals that have inpatient readmissions within thirty days of TKA.¹³⁸ Since blacks have higher thirty-day readmission rates after TKA as noted above, hospitals are again disincentivized from pursuing black TKA patients.¹³⁹ So, quality indicators being applied to hospitals and to doctors that do not have racial and socioeconomic adjustment factors may be contributing to racial disparities in TKA by discouraging providers from pursuing racially diverse populations and instead encouraging providers to focus on populations where their "quality" numbers will appear to be better and rewarded with higher reimbursement and public prestige.

¹³³ See Martsolf et al., *supra* note 102, at 1386, 1390.

¹³⁴ *Id.* at 1385–86 (noting Blue Cross and Blue Shield plans and other payers use readmission rates as part of their criteria for selecting "centers of excellence," and "[r]eadmission rates following . . . TKA also have been added to the formula used by the Centers for Medicare & Medicaid Services (CMS) Hospital Readmissions Reduction Program (HRRP).") (noting that under HRRP, "CMS reduces payments to hospitals that are identified as having excess readmissions.").

¹³⁵ *Id.*

¹³⁶ *Id.*

¹³⁷ Finnegan et al., *supra* note 24, at 1006.

¹³⁸ Martsolf et al., *supra* note 102, at 1386.

¹³⁹ Finnegan et al., *supra* note 24, at 1009–12.

IV. PROPOSED SOLUTIONS TO RACIAL DISPARITIES IN TKA

The causes for racial TKA disparities are a multifactorial and complex interaction of longstanding social and cultural patterns that are not amenable to a single, simple solution or policy change. Local community-based approaches with federal and state support are most likely to decrease racial TKA disparities. Community outreach delivering accurate information regarding treatment options for knee osteoarthritis through Community Health Centers (CHC) and lay health workers could help build trust and health literacy that will decrease the TKA racial disparities. Increasing the cultural competency of providers by providing cultural competency training for physicians and by increasing the diversity of the orthopedic surgeon workforce can also improve the TKA disparity. Setting evidence-based standards for referral of knee osteoarthritis patients to orthopedic surgeons and for informed consent measures for “preference-sensitive” procedures like TKA would likewise decrease TKA disparities by making the referral and consent processes more uniform. Finally, policymakers should recognize that improving black patients’ insurance status (although a worthwhile goal) and encouraging federal disparate impact litigation are not going to significantly improve TKA disparities, and that some current federal “quality” measures may actually be contributing to the problem because they may discourage doctors from providing TKA to black patients by failing to include socioeconomic and racial adjustment factors.

A. Building Trust and Health Literacy Through Community Outreach

Community Health Centers (CHC) and lay community health workers can improve trust and health literacy in African American communities by distributing accurate information regarding knee osteoarthritis treatments and by assisting with preoperative and postoperative care of TKA patients.

- i. Community Health Centers and health literacy programs can be used to restore trust and to educate

black patients regarding the benefits of TKA and to help them better access orthopedic specialty care.

The lack of trust among African American communities toward the health care system “may be fixable by communicating better with patients and taking actions that improve mutual respect and understanding.”¹⁴⁰ One way communication can be improved is by disseminating accurate and transparent information on TKA through Community Health Centers (CHC). For over forty-five years, the Health Resources and Services Administration of the U.S. Department of Health and Human Services has supported CHCs to “provide comprehensive, culturally competent, quality primary healthcare and supportive services to medically underserved communities and vulnerable populations.”¹⁴¹ CHCs “serve as the primary medical home for more than twenty-seven million people in 10,400 rural and urban communities across America.”¹⁴² In 2017, 62% of CHC patients were racial and ethnic minorities.¹⁴³ Around 26% of CHC patients are African American, which translates into around seven million black patients being treated annually in CHCs.¹⁴⁴ Since there are around forty-three million African Americans in the United States, roughly 16.3% of African Americans are being treated annually in CHCs providing access to a significant portion of the United States’ African American population, who may more widely distribute information to family members and friends potentially impacting an even larger percentage of the African American population.¹⁴⁵

¹⁴⁰ Johns Hopkins Medicine, *supra* note 58.

¹⁴¹ Dykes, *supra* note 37, at 1198; *see also How to Find Low-Cost Health Care in Your Community*, HEALTHCARE.GOV, <https://www.healthcare.gov/community-health-centers/> (last visited Aug. 28, 2018).

¹⁴² Nat’l Ass’n of Cmty. Health Ctrs., *About Our Health Centers*, <http://www.nachc.org/about-our-health-centers/> (last visited Aug. 28, 2018).

¹⁴³ Nat’l Ass’n of Cmty. Health Ctrs., *What are Health Centers and Who do They Serve?*, http://www.nachc.org/wp-content/uploads/2017/11/Americas_Health_Centers_Nov_2017.pdf.

¹⁴⁴ Julie Ajinkya & Gabby Bryant, *Cuts to Community Health Centers Hurt Communities of Color the Most*, Ctr. for Am. Progress (Aug. 12, 2011, 9:00 AM), <https://www.americanprogress.org/issues/healthcare/news/2011/08/12/10150/cuts-to-community-health-centers-harm-communities-of-color-the-most/>.

¹⁴⁵ U.S. CENSUS BUREAU, *Quick Facts United States*, <https://www.census.gov/quickfacts/fact/table/US/PST045216#qf-headnote-a> (13.3% of 323 million Americans are black, or forty-three million African

“CHCs are governed by community boards composed of at least a fifty-one percent majority of health center patients who represent the population served.”¹⁴⁶ The ACA “provides new funding for networks comprised of a hospital and CHC to provide comprehensive, coordinated, and integrated health care services for low-income populations.”¹⁴⁷

First, one method to increase trust among African Americans in TKA services is to begin initiatives inside CHCs to educate patients and primary care providers regarding the benefits of TKA and realistically state the risks and benefits of the procedure. Blacks often have “medical information networks [that] are either less diverse or work differently than mainstream white Americans’,” which potentially limits the osteoarthritis treatment options with which blacks are familiar.¹⁴⁸ Some studies have shown that blacks are less willing to undergo risky medical procedures like cardiac surgery, mostly because they are less familiar with the procedures.¹⁴⁹ With regard to TKA, blacks report less confidence in the efficacy of TKA, which may be partially due to a lack of information regarding the risks and benefits.¹⁵⁰

Providing easy access to accurate TKA information in CHCs could help. Making sure the increased risks of African American race are not overemphasized might increase patient confidence. For example, blacks have a 1.75% increase in readmission within 30 days after TKA, but at least 90–97% of blacks are *not* readmitted, so the actual risk of readmission is relatively small.¹⁵¹ Likewise, blacks have excellent overall functional scores after TKA, even though the scores are lower than whites; researchers specifically noted that even with lower postoperative function scores, the scores were still high and cannot justify underuse of TKA in African Americans based on a

Americans in 2016).

¹⁴⁶ Dykes, *supra* note 37, at 1198.

¹⁴⁷ Bowser, *supra* note 2, at 96 (noting the ACA provided \$11 billion to CHCs with \$9.5 billion allocated to “create new health center cities in medically underserved areas.”).

¹⁴⁸ Chang et al., *supra* note 14, at 121.

¹⁴⁹ *Disparities among Medicare Patients*, *supra* note 18, at 1358.

¹⁵⁰ *Id.*

¹⁵¹ Siracuse et al., *supra* note 27, at e112(1) (noting that 2.8% overall average readmission rate for primary TKA with the total risk depending upon the patient’s other risk factors in addition to race).

perception of lesser functional gains.¹⁵² Similarly, even though revision rates are higher among blacks, revision risk is still under 6% within five years.¹⁵³ Again, although the risk is higher for numerous complications, blacks still have excellent results from TKA.¹⁵⁴ If this information is available for CHC patients with knee osteoarthritis, African Americans may be more likely to consider TKA at an earlier stage, and since over seven million blacks are treated at CHCs annually, a significant part of the African American community can be reached. Literature appropriate for distribution at CHCs is readily available.¹⁵⁵

Second, black patients may benefit from health literacy programs designed to teach them how best to access the health care system and participate in their treatment decisions.¹⁵⁶ Most “patients may have little knowledge or experience of where to go for specialty care.”¹⁵⁷ Higher-volume hospitals have been found to generally have lower complication rates than low-volume centers.¹⁵⁸ Researchers found that blacks “[a]re more likely to undergo total knee arthroplasty in hospitals with lower annual volumes.”¹⁵⁹ In one study, researchers “found that nonwhite, poor, less educated patients from rural areas and patients from urban areas with a high concentration of . . . minorities were more likely to ‘bypass’ a high-volume hospital and have total knee arthroplasty within a low-volume hospital.”¹⁶⁰ Patients should be educated regarding the types of hospitals available and alternatives available

¹⁵² Kamath et al., *supra* note 13, at 3355 (“[T]he scores and motion were high for all subgroups, and underuse of TKA in women and African-Americans cannot be justified based on a perception of lesser functional gains.”).

¹⁵³ Bass et al., *supra* note 15, at 2103 (noting 2 to 5.7% require revision).

¹⁵⁴ Mahomed et al., *supra* note 9, at 1226 (“Overall, the risks of adverse outcomes in the ninety days after both primary and revision total knee replacement are very low.”); Nwachukwu et al., *supra* note 25; Zhang et al., *supra* note 8, at 1248 tbl.III.

¹⁵⁵ Chang et al., *supra* note 14, at 121 (noting they did not find racial bias addressing mostly “white male concerns” in the literature handed out by the medical providers in their study).

¹⁵⁶ Nelson, *supra* note 2, at S1379–80.

¹⁵⁷ Zhang et al., *supra* note 8, at 1250.

¹⁵⁸ Bass et al., *supra* note 15, at 2103 (noting the “risk of revision TKA is higher in patients who undergo surgery at a low-volume hospital.”).

¹⁵⁹ Zhang et al., *supra* note 8, at 1250.

¹⁶⁰ *Id.* (quoting Elena Losina, Elizabeth A. Wright, Courtenay L. Kessler, Jane A. Barrett, Anne H. Fossel, Alisha H. Creel, Nizar N. Mahomed, John A. Baron & Jeffrey N. Katz, *Neighborhoods Matter: Use of Hospitals with Worse Outcomes Following Total Knee Replacement by Patients from Vulnerable Populations*, 167 ARCH. INTERN. MED. 182, 182–86 (2007)).

to them that may include high-volume specialty hospitals.¹⁶¹ Encouraging black patients to use higher-quality facilities would likely significantly impact complication rates. In addition, primary care physicians treating low-income populations “typically refer within their network,” which can lead to physician referral patterns that contribute to TKA disparities in use and in referral to high-volume providers—so primary care physicians should be encouraged to refer to quality providers as well.¹⁶²

- ii. Lay health workers in the community can help improve trust and health literacy by directly interacting with black communities and patients.

HHS’s Action Plan includes a strategy to promote the use of lay community health workers to “provide health education and support to their community members” by providing enrollment assistance and acting as liaisons between the public and health organizations.¹⁶³ Community health workers can promote participation in health education, behavioral health education, prevention, and health insurance programs—all of which may decrease TKA complications and increase access and awareness of TKA for knee osteoarthritis patients.¹⁶⁴

One example of such use of community health workers is the lay-health worker (LHW) model. LHW models employ lay-health workers to assess and develop “personalized social needs plans for enrolled patients (for example, transportation and community resource identification), with post-discharge follow-up calls.”¹⁶⁵

¹⁶¹ *Id.*

¹⁶² *Id.*

¹⁶³ U.S. DEPT OF HEALTH & HUMAN SERVS., *HHS Action Plan to Reduce Racial and Ethnic Health Disparities: A Nation Free of Disparities in Health and Health Care* 20 (2011),

https://minorityhealth.hhs.gov/npa/files/Plans/HHS/HHS_Plan_complete.pdf.

¹⁶⁴ U.S. DEPT OF HEALTH & HUMAN SERVS., *HHS Action Plan to Reduce Racial and Ethnic Health Disparities: A Nation Free of Disparities in Health and Health Care* (2011),

https://minorityhealth.hhs.gov/npa/files/Plans/HHS/HHS_Plan_complete.pdf.

¹⁶⁵ Roberto Cardarelli, Mary Horsley, Lisa Ray, Nancy Maggard, Jennifer Schilling, Sarah Weatherford, Fran Feltner & Kaylay Gilliam, *Reducing 30-Day Readmission Rates in a High-Risk Population Using a Lay-Health Worker Model in Appalachia Kentucky* (February 21, 2018),

<https://academic.oup.com/her/advance-article>

abstract/doi/10.1093/her/cyx064/4828079?redirectedFrom=fulltext.

LHWs can improve health literacy postoperatively and thereby reduce complications by addressing social needs and decreasing readmissions of high-risk minority patients in rural areas.¹⁶⁶ In one study of general hospital admissions, “there was a 47.7% relative reduction of 30-day hospital readmission rates” in LHW model patients.¹⁶⁷ “Once adjusting for education, transportation cost, and anxiety symptoms, there was a 77% decrease in odds” of readmission for patients in the LHW program.¹⁶⁸ LHWs have the potential to “improve transitions in care from the hospital setting, especially for patients at high-risk with persistent social needs”—potentially disproportionately improving care in the African American population.¹⁶⁹

Another method of creative community outreach is exemplified by a recent NIH-funded program to treat depression in rural African Americans through a partnership between a tertiary care medical center and twenty-four African American churches.¹⁷⁰ One researcher notes, “[c]hurches in African-American rural communities are a key partner to reach people,” and noted that they had “partnered with churches to address physical health issues in the past” as well.¹⁷¹ Community outreach in African American churches distributing appropriately designed information on TKA might help correct TKA disparities by building trust and distributing accurate information.¹⁷²

B. Improving Provider Cultural Competency

Improving the cultural competency of providers of knee osteoarthritis services through cultural competency training and by increasing the diversity of orthopedic surgeons would decrease TKA disparities.

¹⁶⁶ *Id.*

¹⁶⁷ *Id.*

¹⁶⁸ *Id.*

¹⁶⁹ *Id.*

¹⁷⁰ U. Ark. for Med. Sci., *NIH Funds UAMS Study of Depression Program in the Delta*, UAMS NEWS (June 2, 2016), <https://uamshealth.com/news/2016/06/02/nih-funds-uams-study-of-depression-program-in-delta-2/>.

¹⁷¹ *Id.*

¹⁷² *Id.*

- i. Cultural competency training of physicians and surgeons who treat knee osteoarthritis could help decrease racial disparities in TKA.

“Cultural competence is defined as a set of behaviors, attitudes, and policies that help organizations and staff work effectively with people of different cultures.”¹⁷³ Cultural competence training can improve physicians’ communication with minorities and their recognition of cultural cues regarding pain, insecurity, and communication difficulties. There is compelling evidence that doctors who participate in cultural competence training can improve the quality of care that they deliver to black patients.¹⁷⁴ Cross-cultural physician training is likely to improve the doctor-patient relationship by reducing the odds of interpersonal bias in the relationship, potentially remedying issues related to “shortcutting” mentioned above.¹⁷⁵ Cultural competence training promotes self-awareness of the doctor’s own cultural views and attitudes toward cultural differences and helps physicians develop knowledge and cross-cultural skills to “promote positive and effective interactions with diverse cultures.”¹⁷⁶ Culturally competent physicians can develop understanding of the core needs of African American patients and design services and materials to strategically meet those needs.¹⁷⁷

There are several ways cross-cultural education could reduce racial disparities. First, cross-cultural training might decrease under-scheduling of TKAs by surgeons related to perceived distrust issues in black patients if non-black physicians better understood black culture and were more aware of the challenges and discrimination that their black TKA patients may have experienced in the health care system. Second, cross-cultural training of providers to

¹⁷³ *Cross-Cultural Competence Certificate Series*, UCDAVIS.EDU, http://sdps.ucdavis.edu/certificates/cross_cultural_competence.html (last visited Sept. 7, 2018).

¹⁷⁴ See Dykes, *supra* note 37, at 1201.

¹⁷⁵ See Yearby, *supra* note 2, at 1296 (“Interpersonal bias is the conscious (explicit) and/or unconscious (implicit) use of prejudice in interactions between individuals.”).

¹⁷⁶ DEPT OF HEALTH & HUMAN SERVS., *Cultural Competence*, HHS.GOV, <https://www.hhs.gov/ash/oah/resources-and-training/tpp-and-paf-resources/cultural-competence/index.html> (last visited Sept. 8, 2018).

¹⁷⁷ *Id.*

better recognize pain issues in blacks could lead to earlier scheduling of TKAs at a rate more consistent with white patients. Further, better surgeon recognition of blacks' pain levels could reduce complication rates by preventing unnecessary return visits to the ED and possibly reducing thirty-day readmission rates and shorten hospital stays (by referring more black patients to rehabilitation units).¹⁷⁸

One goal of the HHS Action Plan is to “[s]trengthen the nation’s health and human services infrastructure and workforce” by collaborating and enhancing culturally competent healthcare service delivery by working on CLAS Standards (Culturally and Linguistically Appropriate Services in Health Care Standards).¹⁷⁹ CLAS Standards were released in 2000.¹⁸⁰ The ACA supports the development of culturally competent curricula in educational training.¹⁸¹ At a minimum, physicians should be required to take the one-hour CME course on HHS’s website entitled “A Physician’s Practical Guide to Culturally Competent Care” to help improve “awareness, knowledge, and skills to better treat the increasingly diverse U.S. population they serve.”¹⁸² Some healthcare professional schools already have more significant cultural competence training incorporated into their curricula.¹⁸³

ii. Increasing diversity of orthopedic surgeons would likely decrease racial TKA disparities.

Increasing diversity among orthopedic surgeons will likely help decrease racial disparities in TKA. HHS’s Action Plan includes a strategy to increase the diversity and cultural competency of clinicians.¹⁸⁴ “In a diverse

¹⁷⁸ See Finnegan et al., *supra* note 24, at 1011–12.

¹⁷⁹ U.S. DEP’T OF HEALTH & HUMAN SERVS., HHS ACTION PLAN TO REDUCE RACIAL AND ETHNIC HEALTH DISPARITIES: A NATION FREE OF DISPARITIES IN HEALTH AND HEALTH CARE (2011), https://minorityhealth.hhs.gov/npa/files/Plans/HHS/HHS_Plan_complete.pdf.

¹⁸⁰ *Id.* at 20.

¹⁸¹ Dykes, *supra* note 37, at 1201.

¹⁸² U.S. DEP’T OF HEALTH & HUMAN SERVS., *A Physician’s Practical Guide to Culturally Competent Care*, THINKCULTURALHEALTH.HHS.GOV, <https://cccm.thinkculturalhealth.hhs.gov> (last visited Sept. 8, 2018).

¹⁸³ See, e.g., Cross-Cultural Competence Certificate Series, UCDAVIS.EDU, http://sdps.ucdavis.edu/certificates/cross_cultural_competence.html (last visited Sept. 7, 2018).

¹⁸⁴ U.S. DEP’T OF HEALTH & HUMAN SERVS., HHS ACTION PLAN TO REDUCE RACIAL AND ETHNIC HEALTH DISPARITIES: A NATION FREE OF DISPARITIES IN

nation where sex, race, and ethnicity play an important role in health care, orthopaedic surgery has been a specialty historically lacking in diversity.”¹⁸⁵ Orthopedic surgeons are predominantly white males.¹⁸⁶ One study found that only 4% of orthopedic surgeons are African American, which is significantly lower than the rate for the general surgery, internal medicine, pediatrics, and family medicine.¹⁸⁷ Similarly, Johns Hopkins researchers noted that only about 4% of physicians are black even though blacks make up 12% of the U.S. population.¹⁸⁸

A more diverse orthopedic specialty would likely improve orthopedic doctor-patient relationships for blacks and decrease TKA disparity for several reasons. First, black patients are more likely to trust and be satisfied if treated by doctors of the same race. Race concordance has been shown to improve patient satisfaction with patients in one study reporting the highest satisfaction level when they were race concordant with their doctor, and with all respondents reporting “greater satisfaction with physicians from their own race.”¹⁸⁹ Similarly, studies show that “having a physician from the same race fosters patient trust and improves health care satisfaction scores.”¹⁹⁰ Likewise, studies have shown that “[p]atients who are managed by a physician from the same culture are more likely to be satisfied with treatment and with their ability to communicate with their provider.”¹⁹¹

Second, black orthopedic surgeons will be more likely to settle in African American communities increasing the availability and proximity of TKA services to black patients and to the local medical community. Minority medical students are more likely to end up practicing in underserved minority communities. “[T]he percentage of minority medical students who plan to eventually practice in underserved areas has been shown to be *four times* that

HEALTH AND HEALTH CARE (2011), https://minorityhealth.hhs.gov/npa/files/Plans/HHS/HHS_Plan_complete.pdf.

¹⁸⁵ Day et al., *supra* note 7, at 2334.

¹⁸⁶ *See id.* at 2332.

¹⁸⁷ *Id.* at 2331.

¹⁸⁸ Johns Hopkins Medicine, *supra* note 58.

¹⁸⁹ Thomas A. Laveist, *Is Doctor-Patient Race Concordance Associated with Greater Satisfaction with Care?* 43 J. HEALTH & SOC. BEHAV. 296, 303 (2002).

¹⁹⁰ Johns Hopkins Medicine, *supra* note 58.

¹⁹¹ Day et al., *supra* note 7, at 2328 (emphasis added).

of other medical students.”¹⁹² The pattern holds after medical school such that African American physicians are “much more likely than their white colleagues to locate their practices in areas with large minority populations.”¹⁹³ More specifically, in one physician survey, African American physicians were *five times* more likely to practice in African American communities than were white physicians.¹⁹⁴

Third, more African American orthopedists are needed because black orthopedists are more likely to pursue research topics on health disparities, which might eventually answer unanswered questions and help solve the problem.¹⁹⁵ Finally, increasing the diversity of orthopedic surgeons would likely improve cross-cultural competence of white orthopedic surgeons through interaction with black colleagues as well, since studies show that “students from medical schools with more diverse student bodies have been shown to feel more confident managing patients from different cultures.”¹⁹⁶

While stating the need to increase minority orthopedic surgeons seems obvious, exactly how to manage the task is more speculative. Obviously, the new black surgeons will need to be equally well trained as their white counterparts or patients may still face trust and quality issues. To increase the number of minority orthopedic surgeons will take time (since it takes at least five years after medical school to train orthopedic surgeons) and a better understanding of the reasons behind the disparity in orthopedic surgeon numbers. It seems doubtful that orthopedic residency programs are intentionally discriminating against black applicants (see IOM statement above).¹⁹⁷ The reasons behind this lack of diversity are not clear and could be related to standardized test scores (since orthopedic surgery is a very competitive field for residency slots), a significantly less diverse composition of the applicant pools for orthopedic surgery slots, financial expenses associated with applying to

¹⁹² *Id.* (emphasis added).

¹⁹³ Bowser, *supra* note 2, at 108.

¹⁹⁴ *Id.*

¹⁹⁵ Day et al., *supra* note 7, at 2328.

¹⁹⁶ *Id.*

¹⁹⁷ Nelson, *supra* note 2, at S1377 (noting that “there is no evidence that any significant proportion of health care professionals in the United States harbors overtly prejudicial attitudes”).

competitive residency slots, lack of support from orthopedic faculty of black candidates, and/or possible “differing levels of interest in [orthopedic surgery] among medical students.”¹⁹⁸

First, continued general support for African American students in medical schools is important, so ACA changes in this area should be protected. “Section 5401 of the ACA amended the Public Health Service Act to continue to provide Center of Excellence grants to educational entities . . . for the purpose of supporting programs of excellence in health professions education for under-represented minority students.”¹⁹⁹ These Centers for Excellence programs “target, attract, and retain minority applicants in health professions schools.”²⁰⁰ Section 5402 of the ACA authorizes educational assistance such as loan repayment and scholarships for disadvantaged health professions students.²⁰¹ HHS’s Action Plan also includes a strategy to increase the diversity of the health care workforce by creating a pipeline program for students to increase diversity in bioscience professions and increase education and training opportunities for low-income individuals for occupations in health care fields through the Health Profession Opportunity Grant (HPOG).²⁰² The ACA reauthorizes and expands HPOG, which are designed to “provide training in high-demand . . . professions” to low-income populations, including high concentrations of African Americans.²⁰³

The ACA also includes several provisions premised on the ideas (1) that “minority healthcare providers are significantly more likely to treat minority patients and practice in poor and underserved areas” and (2) that “more diverse providers who reflect the racial and ethnic composition of the population” will improve access and delivery of health care to those same racial and ethnic populations.²⁰⁴ To help expand the workforce, the ACA

¹⁹⁸ *Id.* at 2334.

¹⁹⁹ Dykes, *supra* note 37, at 1200–01.

²⁰⁰ Bowser, *supra* note 2, at 109.

²⁰¹ Dykes, *supra* note 37, at 1201.

²⁰² U.S. DEP’T OF HEALTH & HUMAN SERVS., HHS ACTION PLAN TO REDUCE RACIAL AND ETHNIC HEALTH DISPARITIES: A NATION FREE OF DISPARITIES IN HEALTH AND HEALTH CARE 21–22 (2011), https://minorityhealth.hhs.gov/npa/files/Plans/HHS/HHS_Plan_complete.pdf.

²⁰³ Dykes, *supra* note 37, at 1201.

²⁰⁴ *Id.* at 1200.

established the National Health Care Workforce Commission, which could help institute some of the changes suggested in this paper.²⁰⁵

Second, a way to possibly increase the interest and application level of black applicants to orthopedic surgery residency programs is to increase the number of black orthopedic faculty members to mentor minority students and foster their interest in orthopedics. Senior-level faculty members significantly influence resident selection and can help encourage diversity in selection of orthopedic residents.²⁰⁶ Only 2.5% of orthopedic faculty are black, although that number has increased from 1.9% in 1996.²⁰⁷ Hiring and mentoring black orthopedic academic faculty therefore should be supported to help diminish disparities. The ACA includes “faculty loan repayment programs that aim to attract and retain minority professors at health professions schools,”²⁰⁸ which should be supported and expanded with a focus on orthopedics because TKA (and other orthopedic) disparities are a priority.

Third, giving medical students more exposure to orthopedic surgery during medical school might increase interest and competitiveness of black students, since medical schools with required orthopedic courses have been shown to have greater interest among black students in orthopedics than medical schools without those required courses.²⁰⁹

Fourth, another way to increase the number of black orthopedic surgeons would be to develop academic orthopedic residency and fellowship programs affiliated with historically black colleges and universities (HBCUs).²¹⁰ One model might be to follow the ACA example, but on a larger scale directed at orthopedic surgery residency slots. The ACA allocates \$12 million in grants to health professional schools at HBCUs, directed mostly at mental and behavioral health education.²¹¹ Perhaps similar grants could be developed to facilitate the training of orthopedic surgeons at HBCUs. Similarly,

²⁰⁵ *Id.*

²⁰⁶ Day et al., *supra* note 7, at 2334–35.

²⁰⁷ *Id.* at 2334.

²⁰⁸ Bowser, *supra* note 2, at 109.

²⁰⁹ Day et al., *supra* note 7, at 2335.

²¹⁰ *See* Bowser, *supra* note 2, at 109.

²¹¹ *Id.*

developing more accredited orthopedic subspecialty fellowship training programs in adult total joint reconstruction in or near black communities would likely increase the number of high-volume knee arthroplasty surgeons practicing in black communities, thereby improving access to quality providers, which may foster trust and improve outcomes.²¹²

Finally, increasing support for orthopedic surgeons practicing in black communities might help. The ACA requires that health exchange health plans include “essential community providers” who serve underserved populations in their plans.²¹³ Broadening the definition of essential community providers to include orthopedic surgeons practicing in predominantly black communities to fill underserved arthroplasty needs might help.²¹⁴ There is evidence that health plans disproportionately exclude black physicians by using race-neutral criteria, so expanding the definition of essential community providers might help prevent exclusion of black orthopedists.²¹⁵ This might also increase the interest of black medical students in orthopedics if they are exposed to black orthopedic surgeons as role models during their formative years.

C. Setting Evidence-Based Standards for Knee Osteoarthritis Treatment

Racial disparities in TKA could be diminished by setting evidence-based standards for primary care referral of knee osteoarthritis patients to orthopedic surgeons. In addition, more uniform informed consent processes using decision aids would likely diminish disparities by decreasing overuse of TKAs among whites.

- i. Evidence-based standards for referral of knee osteoarthritis patients by primary care physicians to orthopedic surgeons should be developed.

²¹² Jeremy S. Somerson, Brandon A. Stein & Michael A. Wirth, *Distribution of High-Volume Shoulder Arthroplasty Surgeons in the United States Data from the 2014 Medicare Provider Utilization and Payment Data Release*, 98 J. BONE JOINT SURG AM. 98:e77(18) (2016) (noting that higher volume shoulder arthroplasty surgeons have lower complication rates and these surgeons tend to cluster unequally geographically around cities near locations where accredited fellowships are located).

²¹³ Bowser, *supra* note 2, at 101.

²¹⁴ *See id.* at 102.

²¹⁵ *See id.* at 102–03.

National standard-setting, with regard to referral by primary care physicians to orthopedic surgeons for TKA consideration through clinical practice guidelines and evidence-based medicine, might help close the racial TKA gaps by increasing referral of black patients by their providers to orthopedic surgeons at earlier stages of knee osteoarthritis. One study suggested that up to 35% of national arthroplasty disparities among black women could be eliminated by simply increasing the arthroplasty rates in regions where black women live.²¹⁶ Some researchers report that these regional variations in arthroplasty rates likely reflect differences in local medical opinion regarding the value of these procedures.²¹⁷ Transparent national standards for TKA referral could increase patients' trust and diminish questions by black patients regarding their TKA candidacy.

Primary care physicians often stand to benefit financially by treating knee osteoarthritis themselves nonoperatively with medications, physical therapy, and steroid injections. Primary care doctors may generate significant revenue on repeat office visits and injection procedures. I witnessed this scenario occasionally during my orthopedic career where a patient was referred to me only after getting what I would consider to be too many steroid injections, too many primary care physician doctor visits, and too much delay prior to TKA—sometimes going on for years. It is possible that providers in predominantly black communities get a significant part of their income by treating knee osteoarthritis themselves, and once the patient is referred to an orthopedic surgeon, that revenue stream is lost. One way to ensure that patients with knee osteoarthritis get to at least consider TKA is for providers like Medicare to refuse to pay for more than a single steroid injection into a patient's knee by a non-orthopedist. This might encourage patients to present for specialty care earlier and at least allow them to hear the pros and cons of TKA before deciding upon prolonged nonoperative management. Earlier presentation might also diminish complication rates because the patient would present to the surgeon with less advanced arthritis and therefore fewer operative risks.

²¹⁶ *Disparities among Medicare Patients*, *supra* note 18, at 1356–57.

²¹⁷ *Id.* at 1351.

- ii. Better informed consent processes including the use of decision aids should be utilized for preference sensitive care like TKA to decrease disparities and prevent overuse.

To resolve TKA inequalities, ensuring that knee osteoarthritis patients are well-informed about the risks and benefits of “preference-sensitive” procedures like TKA is important so that they can make free choices without artificial barriers.²¹⁸ In one study of over 3,500 medical decisions, “less than 10% of decisions met the minimum standards for informed decision making.”²¹⁹ Significant variations in the utilization of preference-sensitive procedures between hospital regions suggests that “patients may receive care aligned not with their values and preferences, but with their physicians’ payment incentives.”²²⁰ For example, the rate of total hip replacement varied by as much as 500% across 300 hospital regions in one study.²²¹

To address this issue, the ACA “encourages greater use of shared decision making in health care” and attempts to implement this approach by encouraging the use of “decision aids—written materials, videos, or interactive electronic presentations designed to inform patients and their families about care options; each option’s outcomes, including benefits and possible side effects; the health team’s skills; and costs.”²²² Decision aids are “medical information in the form of software, pamphlets, and other media” and are defined by Section 936 of the ACA as “an educational tool that helps patients . . . understand and communicate their beliefs and preferences related to their treatment options, and to decide with their health care provider what treatments are best for them based on their treatment options, scientific evidence, circumstances, beliefs, and preferences.”²²³

Patient preferences are best honored through a

²¹⁸ *See id.* at 1358.

²¹⁹ Lee, *supra* note 123, at 6.

²²⁰ *Id.* at 6.

²²¹ *Id.*

²²² *Id.*

²²³ Samuel Hansen, *The Role of Decision Aids in the Affordable Care Act*, 2013 6, 6–7, (quoting the Affordable Care Act, 42 U.S.C. § 299b-36(b)(1) (2010)).

“collaborative process[] between patients . . . and clinicians that engages the patient . . . in decision-making [and] . . . provides patients . . . with information about trade-offs among treatment options.”²²⁴ Shared decision-making increases patient knowledge, improves health literacy, ensures better alignment of care with the patient’s values, and may help reduce unwarranted disparities in care and costs.²²⁵ Studies show that patients who use decision aids have increased knowledge, more accurate risk perceptions, greater likelihood of receiving care aligned with their values, and less passivity in the decision-making process.²²⁶ Patients who participate in shared decision-making tend to choose less invasive surgical options and more nonoperative treatments.²²⁷ “Clinical evidence suggests that decision aids generally promote non-interventional treatment options over surgical ones by about 20%.”²²⁸ Use of decision aids led to a 38% decrease in TKAs in one study.²²⁹ If CMS were to begin certifying and implementing patient decision aids in TKA surgery, it might help decrease racial disparities since fewer white patients might choose to undergo TKA while more black patients would be able to make informed decisions.

Section 936 of the ACA provides “guidelines for funding, developing, certifying, and implementing decision aids in the U.S. healthcare system.”²³⁰ Section 3506 of the ACA facilitates shared decision making primarily by funding the development of consensus-based standards and certification of evidence-based patient decision aids to be used by federal health programs like Medicare.²³¹ Implementation can be mandated through Medicare without additional legislation for approaches that improve quality of care or provide savings.²³² If CMS were to implement evidence-based patient decision aids written at the level of an eighth grader and make Medicare reimbursement contingent upon having documentation of decision aid use in the patient’s medical record, significant

²²⁴ Affordable Care Act § 299(b)–36(a).

²²⁵ Lee, *supra* note 123, at 6.

²²⁶ *Id.* at 7.

²²⁷ *Id.*

²²⁸ Hansen, *supra* note 219, at 10.

²²⁹ *Id.*

²³⁰ *Id.* at 6.

²³¹ Lee, *supra* note 223, at 7.

²³² *Id.*

movement toward equalization of TKA rates between blacks and whites in Medicare would likely occur. Ultimately, decision aids should also be employed in the primary care physician's office prior to knee injections to alert the patient to TKA options as well to help prevent long delays in presentation to an orthopedic surgeon by helping the patient understand the risks and benefits of surgery versus continued nonoperative treatments.²³³

D. TKA Disparities are Unlikely to Be Significantly Improved by Some Current Popular Policy Ideas

TKA disparities are (1) unlikely to be significantly improved by equalizing the health insurance status of blacks and whites, (2) unlikely to be significantly improved by federal civil rights legislation, and (3) may already be negatively impacted by some current federal health care quality legislation that does not include racial and socioeconomic adjustment factors.

First, while plans to reduce disparities in health insurance are, without question, worthwhile endeavors to improve access to health care, they are unlikely to significantly impact TKA racial disparities.²³⁴ HHS's Action Plan to Reduce Racial and Ethnic Disparities (Action Plan) has a first goal of reducing disparities in health insurance.²³⁵ But in TKA, the disparity is present even in populations where insurance status is already nondisparate, including Medicare populations and Veterans Administration populations of military patients discussed above. So, while improving black patients' insurance status is a worthy goal, it will not help much, if at all, with addressing racial disparities in TKAs.

Second, new civil rights laws like those in the ACA are unlikely to decrease TKA disparities. The ACA includes Section 1557, which is a "broad new health care specific civil rights mandate" that prohibits facially-neutral health care policies that have disproportionate racial impact.²³⁶

²³³ *Influence of Income*, *supra* note 19, at 2165.

²³⁴ Because up to 26% of blacks versus only 16% of whites are uninsured, and because 32% of blacks versus only 15% of whites are insured by Medicaid (Bass et al., *supra* note 15, at 2107), equalization of insurance coverage would certainly have some effect on the disparity, although the other studies quoted in the text suggest that this effect would not come close to eliminating racial disparities in TKA.

²³⁵ U.S. DEP'T OF HEALTH & HUMAN SERVS., *supra* note 163, at 15.

²³⁶ Watson, *supra* note 63, at 859.

However, TKA racial disparities are complex and multifactorial and cannot be blamed on any specific policy.

Further, disparate impact litigation is unlikely to solve TKA disparities. Under Title VI, disparate impact discrimination is defined as “policies or practices that may be neutral on their face but have the effect of discriminating on the basis of race, color, or national origin.”²³⁷ Title VI applies to discriminatory concerns in health care like access to health services, participation in managed care, physician staff privileges, etc.²³⁸ In equal protection challenges to government actions and policies, the courts require that intent be considered in disparate impact cases.²³⁹ Some have argued that even though “nothing convincingly suggests a pattern of widespread intentional discrimination . . . unconsciously biased decisions on the part of healthcare professionals” are involved in racial disparities, so the court’s requirement that plaintiffs prove that discrimination is intentional should be revisited.²⁴⁰ In *Unequal Treatment*, the IOM made similar arguments, saying “the application of Title VI beyond intentional discrimination to include policies that may create disparate racial impacts could be an important tool for civil rights enforcement.”²⁴¹ The IOM suggested use of “institution-specific statistical evidence of disparities” acquired through “electronic clinical record-keeping” as prima facie evidence of discrimination might be helpful, but noted that proving a causal link between “such disparities and particular policies” would pose significant challenges.²⁴²

²³⁷ Thomas E. Perez, *The Civil Rights Dimension of Racial and Ethnic Disparities in Health Status*, in *UNEQUAL TREATMENT: CONFRONTING RACIAL AND ETHNIC DISPARITIES IN HEALTH CARE* 626, 630 (2003), <https://www.nap.edu/catalog/10260/unequal-treatment-confronting-racial-and-ethnic-disparities-in-health-care>; see generally *Alexander v. Sandoval*, 532 U.S. 275 (2001).

²³⁸ Perez, *supra* note 232, at 630.

²³⁹ Dykes, *supra* note 37, at 1153; see *Sandoval*, 532 U.S. at 280–81.

²⁴⁰ Dykes, *supra* note 37, at 1153 (quoting Barbara A. Noah, *Racial Disparities in the Delivery of Health Care*, 35 *SAN DIEGO L. REV.* 135, 165 (1998)); see *Sandoval*, 532 U.S. at 280–81.

²⁴¹ Inst. of Med. Nat’l Acad., *Assessing Potential Sources of Racial and Ethnic Disparities in Case: Patient- and System-Level Factors*, in *UNEQUAL TREATMENT: CONFRONTING RACIAL AND ETHNIC DISPARITIES IN HEALTH CARE* 125, 158 (2003), <https://www.nap.edu/catalog/10260/unequal-treatment-confronting-racial-and-ethnic-disparities-in-health-care>.

²⁴² *Id.*

However, in *Alexander v. Sandoval*, the U.S. Supreme Court held that without proving discriminatory intent, Title VI did not create a private right of action in cases concerning policies with disparate impact.²⁴³ Since *Sandoval*, private plaintiffs must “establish that the conduct in question amounts to intentional discrimination under Title VI.”²⁴⁴ The IOM called upon Congress to “Fix *Sandoval*” by reinstating a private right of action under Title VI for disparate impact cases without requiring evidence of intentional discrimination, but no such “fix” has been forthcoming.²⁴⁵ However, in TKA disparities a causal link between any specific policy and the disparity is elusive, so allowing a private right of action would flood the courts with unintentional disparate impact cases under federal law removing the potential for more local or state control of an issue that is likely much more controlled by local factors than federal factors.

Further, *Sandoval* applies only to private parties, and the authority of agencies, like the Office of Civil Rights (OCR) at the Department of Health and Human Services (HHS), remains intact.²⁴⁶ OCR also has the authority to review independently (that is, without a complaint) the practices of providers who receive federal funds to ensure compliance with Title VI.²⁴⁷ In my opinion, OCR and Title VI are likely to have minimal impact on racial disparities in TKA because identifying a party or a policy that is causing the disparity is virtually impossible because the disparities result from complex and longstanding cultural factors outlined above that are not causally linkable to specific policies or intentional discrimination.

Third, some current government quality initiatives may be worsening the TKA disparity because they do not include socioeconomic and racial adjustment factors. Quality measures in government programs like the Medicare Shared Savings Program should include socioeconomic and racial adjustment factors so as to not disfavor hospitals or doctors serving minorities and safety-net providers. Although researchers in one study found “inclusion of race/ethnicity and socioeconomic status in the

²⁴³ Perez, *supra* note 237, at 661; *Sandoval*, 532 U.S. at 275.

²⁴⁴ Perez, *supra* note 237, at 630.

²⁴⁵ *Id.* at 661.

²⁴⁶ *Id.*.

²⁴⁷ *Id.* at 656.

risk-adjustment algorithm led to a relative-performance change in readmission rates following THA and TKA at <3% of the hospitals,” the failure to adjust the measures negatively impacts that 3%, plus it may affect the way providers select TKA patients at other facilities.²⁴⁸ In addition, researchers in that study acknowledged that “the hospitals for which the classification of the readmission rate changed may serve a higher proportion of minority patients or act as safety-net hospitals,” and those hospitals affected “might not consider the results to be trivial.”²⁴⁹

“Value-based” Medicare payments likely exacerbate racial disparities in TKA.²⁵⁰ Current value-based programs like the Value-Based Payment Modifier implemented by CMS “are literally taking money from providers that serve the poor and giving it to providers that serve the rich” and worsening disparities without improving performance, according to at least one researcher.²⁵¹ To fix this, race should be added as a variable to adjust for case-mix, so that providers are not penalized for taking care of more vulnerable populations like African Americans.²⁵² In 2020, Merit-Based Incentive Payment System is already set to begin adjusting payments based upon the proportion of patients who are eligible for Medicaid in the practice; so the government is at least starting to recognize this issue, which might help TKA disparities.²⁵³

Further, other programs likewise penalize surgeons who take care of higher-risk minority populations by decreasing surgeons’ reimbursement rates, not recognizing providers as “Centers of Excellence,” and posting substandard numbers on public websites. For example,

²⁴⁸ Martsolf et al., *supra* note 102, at 1385, 1390.

²⁴⁹ *Id.* at 1390.

²⁵⁰ Rita Rubin, *How Value-Based Medicare Payments Exacerbate Health Care Disparities*, JAMA NETWORK (Mar. 13, 2018), <https://jamanetwork.com/journals/jama/fullarticle/2673607>.

²⁵¹ *Id.* (quoting Karen Joynt Maddox, Eric T. Roberts, Alan M. Zaslavsky & Michael McWilliams, *The Value-Based Payment Modifier: Program Outcomes and Implications for Disparities*, ANNALS OF INTERNAL MED. (Feb. 20, 2018), <http://annals.org/aim/article-abstract/2664654/value-based-payment-modifier-program-outcomes-implications-disparities?doi=10.7326%2fM17-1740> (“The VM was not associated with differences in performance on program measures. Performance differences between practices serving higher- and those serving lower-risk patients were affected considerably by additional adjustments, suggesting a potential for Medicare’s pay-for-performance programs to exacerbate health care disparities.”)).

²⁵² Rubin, *supra* note 250.

²⁵³ *Id.*

racially-unadjusted readmission rates are used by Blue Cross Blue Shield as part of their criteria for designating Centers of Excellence.²⁵⁴ CMS uses readmission rates to identify hospitals with excessive readmissions and compares those hospitals on its public Hospital Compare Website.²⁵⁵

Failing to include racial and socioeconomic adjustment factors in quality indicators may discourage surgeons from performing TKAs on black patients. Therefore, quality measures should include racial and socioeconomic adjustment factors to avoid punishing doctors and hospitals who disproportionately care for more vulnerable African American patients.

CONCLUSION

African American patients have significantly different experiences than Caucasian patients in the treatment of knee osteoarthritis with total knee replacement in the United States, even though there is “no evidence that any significant proportion of health care professionals in the United States harbors overtly prejudicial attitudes.”²⁵⁶ Blacks are half as likely to have a TKA compared to whites, and black patients that do have TKA are much more likely than white patients to have complications, including readmission to the hospital, revision of the TKA, and death.²⁵⁷ These disparities are widening and cannot be explained by socioeconomic factors, insurance coverage, or biology. The Agency for Healthcare Research and Quality considers TKA disparities a “key topic” with 6% of the U.S. population suffering from knee osteoarthritis and the number of TKAs performed annually projected to rapidly rise over the next fifteen years.²⁵⁸

The causes of disparities in TKA surgery are complex and multifactorial. Past discrimination in the U.S. health care system has contributed to ongoing cultural and social factors that foster persistent disparities in TKA use

²⁵⁴ Martsolf et al., *supra* note 102, at 1385–86.

²⁵⁵ *Id.*

²⁵⁶ Nelson, *supra* note 2, at S1377; Zhang et al., *supra* note 8, at 1244 (confirming “similar risks of developing arthritis” between blacks and whites).

²⁵⁷ See *supra* notes 22, 24, and 25.

²⁵⁸ Zhang et al., *supra* note 8, at 1244 (confirming “similar risks of developing arthritis” between blacks and whites); Kamath et al., *supra* note 13, at 3355.

and complication rates. First, trust, culture, and bias/stereotyping likely play a significant role. Distrust of physicians by black patients likely leads them to underutilize TKA services and leads their physicians to under-schedule them for surgery. Cultural differences between black patients and predominantly white orthopedic surgeons affect patients' surgical preferences and surgeons' understanding of patients' pain and trust. Subconscious bias and stereotyping through cognitive shortcutting by busy physicians may also play a role. Second, disparities in health literacy and patient preoperative education contribute to blacks underutilizing and whites overutilizing TKA services—widening the racial inequalities. In addition, some well-intentioned “quality” laws may be contributing to the disparities by punishing or discouraging surgeons who offer TKA to predominantly African American populations.

Solutions to racial disparities in TKA are most likely to come from local, community-based approaches with federal and state support. First, community outreach can be used to build trust and health literacy regarding TKA services. Community Health Centers, health literacy programs, and lay health workers can restore trust and educate black patients regarding the benefits of TKA, help them better access quality orthopedic specialty care, and participate directly in preoperative and postoperative care. Second, increasing provider cultural competency will help decrease the disparity and can be done by providing cultural competency training to doctors who treat knee arthritis and by increasing the number of African American orthopedic surgeons. Third, setting evidence-based standards for knee osteoarthritis treatment so that black patients are referred to orthopedic surgeons earlier in the course of the arthritis and so that white patients are better able to make informed decisions that truly reflect their surgical preferences will further close the disparity gap.

Finally, more research is needed. One researcher noted, “One of the most striking findings from our work is that research on orthopedic postoperative outcomes for racial and ethnic minority groups is sparse.”²⁵⁹ Racial disparities in health care are complex issues that may be

²⁵⁹ Nwachukwu et al., *supra* note 25, at 343.

most amenable to research addressing inequalities one disparity at a time.